CLAIMS

1. A device for treating mucositis in a patient, the device comprising:

a housing positioned adjacent to the patient;

a plurality of optoelectronic devices positioned within the housing, the optoelectronic devices emitting radiation at a wavelength suitable for the treatment of mucositis while emitting a minimal amount of heat; and

a cooling system that cools the optoelectronic devices.

2. The device of claim 1, wherein the plurality of optoelectronic devices include a plurality of light-emitting diodes.

3. The device of claim 1, wherein the plurality of optoelectronic devices are positioned within the housing in an array, and wherein the array includes optoelectronic devices emitting radiation at a wavelength of at least one of approximately 670 nanometers, 680 nanometers, 730 nanometers, 780 nanometers, 830 nanometers, and 880 nanometers.

4. The device of claim 1, wherein the plurality of optoelectronic devices emit radiation at a wavelength of approximately 688 nanometers.

5. The device of claim 1, wherein the plurality of optoelectronic devices emit radiation having an energy density of approximately 4 Joules per centimeter.

6. The device of claim 5, wherein the plurality of optoelectronic devices emit radiation having a light intensity of approximately 60 milli-Watts per centimeter.

7. The device of claim 6, wherein the housing is positioned adjacent the patient and the optoelectronic devices emit radiation toward the patient for approximately 70 seconds in order to treat mucositis.

8. The device of claim 1, wherein a translucent cover plate is disposed between the housing and the plurality of optoelectronic devices to electrically isolate the patient from the plurality of optoelectronic devices.

9. The device of claim 1, wherein the cooling system includes a plurality of air vents in the housing and an internal heat sink positioned within the housing.

10. The device of claim 1, wherein the cooling system includes a liquid cooling system.

11. The device of claim 10, wherein the liquid cooling system includes a thermoelectric cooler that provides cooling fluid to the plurality of optoelectronic devices via a plurality of passageways.

12. The device of claim 1, wherein the cooling system includes a temperature sensor positioned adjacent to the plurality of optoelectronic devices and a controller coupled to the temperature sensor and to the plurality of optoelectronic devices, and wherein the controller interrupts power to the plurality of optoelectronic devices if an actual temperature sensed by the temperature sensor exceeds a threshold temperature.

13. The device of claim 12, wherein the threshold temperature is approximately 96 degrees Fahrenheit.

14. The device of claim 1, wherein a reflector is coupled to the housing in order to collimate the radiation emitted by the plurality of optoelectronic devices into substantially parallel rays.

15. The device of claim 1, wherein the device is a mobile lamp.

16. The device of claim 1, wherein the device is a stationary lamp.

17. A device for treating a medical condition in a patient, the device comprising:

a gantry suitable for accommodating the patient;

a housing positioned adjacent the gantry;

a track coupled to at least one of the gantry and the housing;

an array of optoelectronic devices coupled to the housing, the optoelectronic devices emitting radiation suitable for treating the medical condition while emitting a minimal amount of heat; and

a cooling system that cools the array of optoelectronic devices;

wherein at least one of the gantry and the housing moves along the track in order to change a relative position between the gantry and the housing so that the radiation emitted by the array of optoelectronic devices is directed toward the patient.

18. The device of claim 17, wherein the array of optoelectronic devices includes an array of light-emitting diodes.

19. The device of claim 17, wherein the medical condition is mucositis, and wherein the array emits radiation at a wavelength of at least one of approximately 670 nanometers, 680 nanometers, 730 nanometers, 780 nanometers, 830 nanometers, and 880 nanometers.

20. The device of claim 17, wherein the medical condition is mucositis, and wherein the array emits radiation at a wavelength of approximately 688 nanometers.

21. The device of claim 17, wherein the array emits radiation having an energy density of approximately 4 Joules per centimeter.

22. The device of claim 21, wherein the array emits radiation having a light intensity of approximately 60 milli-Watts per centimeter.

23. The device of claim 22, wherein the patient is positioned within the gantry and the array emits radiation toward the patient incrementally for approximately 70 seconds in each increment in order to treat mucositis.

24. The device of claim 17, wherein a translucent cover plate is disposed between the housing and the array to electrically isolate the patient from the optoelectronic devices.

25. The device of claim 17, wherein the cooling system includes a plurality of air vents in the housing and an internal heat sink positioned within the housing.

26. The device of claim 17, wherein the cooling system includes a liquid cooling system.

27. The device of claim 26, wherein the liquid cooling system includes a thermoelectric cooler that provides cooling fluid to the array of optoelectronic devices via a plurality of passageways.

28. The device of claim 17, wherein the cooling system includes a temperature sensor positioned adjacent the array and a controller coupled to the temperature sensor and to the array, and wherein the controller interrupts power to the array if an actual temperature sensed by the temperature sensor exceeds a threshold temperature.

29. The device of claim 28, wherein the threshold temperature is approximately 96 degrees Fahrenheit.

30. The device of claim 17, wherein a reflector is coupled to the housing in order to collimate the radiation emitted by the array into substantially parallel rays.

31. The device of claim 17, wherein the at least one of the gantry and the housing moves along the track in order to direct radiation toward only the patient's gastrointestinal tract.

32. The device of claim 17, wherein the housing is circular in order to substantially encircle the patient with radiation.

33. The device of claim 17, wherein the housing includes a cantilever beam positionable over the patient.

34. A device for treating a medical condition in a patient, the device comprising:

a first housing unit;

a second housing unit coupled to the first housing unit; and

a first array of optoelectronic devices positioned within the first housing unit and a second array of optoelectronic devices positioned within the second housing unit,

the optoelectronic devices emitting radiation suitable for treating the medical condition while emitting a minimal amount of heat,

the first and second housing units positioned adjacent to the patient so that the radiation emitted from the optoelectronic devices substantially encircles the patient.

35. The device of claim 34, wherein the optoelectronic devices include light-emitting diodes.

36. The device of claim 34, wherein the medical condition is mucositis, and wherein the first array and the second array include optoelectronic devices emitting radiation at a wavelength of at least one of approximately 670 nanometers, 680 nanometers, 730 nanometers, 780 nanometers, 830 nanometers, and 880 nanometers.

37. The device of claim 34, wherein the medical condition is mucositis, and wherein the optoelectronic devices emit radiation having a wavelength of approximately 688 nanometers.

38. The device of claim 34, wherein the optoelectronic devices emit radiation having an energy density of approximately 4 Joules per centimeter.

39. The device of claim 38, wherein the optoelectronic devices emit radiation having a light intensity of approximately 60 milli-Watts per centimeter.

40. The device of claim 39, wherein the patient is positioned adjacent the first and second housing units and the optoelectronic devices emit radiation toward the patient for approximately 70 seconds in order to treat mucositis.

41. The device of claim 34, wherein a translucent cover plate is disposed between the first housing unit and the first array of optoelectronic devices to electrically isolate the patient from the optoelectronic devices.

42. The device of claim 34, and further comprising a cooling system to cool the optoelectronic devices.

43. The device of claim 42, wherein the cooling system includes a plurality of air vents in the first and second housing units and an internal heat sink positioned within the first and second housing units.

44. The device of claim 42, wherein the cooling system includes a liquid cooling system.

45. The device of claim 44, wherein the liquid cooling system includes a thermoelectric cooler that provides cooling fluid to the optoelectronic devices via a plurality of passageways.

46. The device of claim 42, wherein the cooling system includes a temperature sensor positioned adjacent to a one of the first array and the second array and a controller coupled to the temperature sensor and to the first array and the second array, and wherein the controller interrupts power to the first array and the second array if an actual temperature sensed by the temperature sensor exceeds a threshold temperature.

47. The device of claim 46, wherein the threshold temperature is approximately 96 degrees Fahrenheit.

48. The device of claim 34, wherein a reflector is coupled to the first housing unit in order to collimate the radiation emitted by the first array of optoelectronic devices into substantially parallel rays.

49. The device of claim 34, wherein the optoelectronic devices are positioned within the first and second housing units so that radiation is directed toward the patient's gastrointestinal tract.

50. The device of claim 34, wherein the first and second housing units are concave, and wherein the first and second housing units are positioned substantially horizontal to form a bed enclosure for a patient to lie in.

51. The device of claim 34, and further comprising

a third housing unit coupled to a one of the first and second housing units;

a fourth housing unit coupled to the third housing unit and to a one of the first and second housing units; and

a third array of optoelectronic devices positioned within the third housing unit and a fourth array of optoelectronic devices positioned within the fourth housing unit;

wherein the first, second, third, and fourth housing units are positioned substantially vertical to form a booth enclosure for a patient to stand in.

52. A device for treating a medical condition in a patient, the device comprising:

a plurality of modules, each one of the plurality of modules including

at least one electrically and thermally conductive lead frame substrate having an upper surface and being adapted to act as a heat sink,

at least one optoelectronic device electrically connected to the upper surface of the lead frame substrate, the optoelectronic device emitting radiation suitable for treating the medical condition while emitting a minimal amount of heat, and

at least one connector interconnected with the lead frame substrate that is adapted to interconnect each one of the plurality of modules with at least one other of the plurality of modules;

wherein the lead frame substrates are interconnected to form an array of a plurality of modules, the array being positioned adjacent to the patient so that radiation emitted by the optoelectronic devices is absorbed by the patient.

53. The device of claim 52, wherein the at least one optoelectronic device is a light-emitting diode.

54. The device of claim 52, wherein the medical condition is mucositis, and wherein the array emits radiation at a wavelength of at least one of approximately 670 nanometers, 680 nanometers, 730 nanometers, 780 nanometers, 830 nanometers, and 880 nanometers.

55. The device of claim 52, wherein the medical condition is mucositis, and wherein the array emits radiation having a wavelength of approximately 688 nanometers.

56. The device of claim 52, wherein the array emits radiation having an energy density of approximately 4 Joules per centimeter.

57. The device of claim 56, wherein the array emits radiation having a light intensity of approximately 60 milli-Watts per centimeter.

58. The device of claim 57, wherein the patient is positioned adjacent the array and the array emits radiation toward the patient for approximately 70 seconds in order to treat mucositis.

59. The device of claim 52, wherein a translucent cover plate is disposed adjacent to the array to electrically isolate the patient from the optoelectronic devices.

60. The device of claim 52, and further comprising a cooling system to cool the array.

61. The device of claim 60, wherein the cooling system includes a liquid cooling system.

62. The device of claim 61, wherein the liquid cooling system includes a thermoelectric cooler that provides cooling fluid to the array via a plurality of passageways.

63. The device of claim 60, wherein the cooling system includes a temperature sensor positioned adjacent to the array and a controller coupled to the temperature sensor and to the array, and wherein the controller interrupts power to the array if an actual temperature sensed by the temperature sensor exceeds a threshold temperature.

64. The device of claim 63, wherein the threshold temperature is approximately 96 degrees Fahrenheit.

65. The device of claim 52, wherein a reflector is disposed adjacent to the array in order to collimate the radiation emitted by the array into substantially parallel rays.

66. The device of claim 52, wherein the array is coupled to a mobile lamp.

67. The device of claim 52, wherein the array is coupled to a stationary lamp securable to a wall.

68. A device for treating a medical condition in a patient, the device comprising:

a housing;

a plurality of optoelectronic devices positioned within the housing, the optoelectronic devices emitting radiation at a wavelength suitable for treating the medical condition; and

a radiation blanket coupled to the housing and positioned adjacent to the patient so that radiation emitted by the plurality of optoelectronic devices is directed toward the patient.

69. The device of claim 68, wherein the radiation blanket includes a flexible membrane filled with a diffuser fluid.

70. The device of claim 69, wherein the diffuser fluid is a lipid solution.

71. The device of claim 69, wherein the flexible membrane includes a top membrane constructed of a non-translucent material and a bottom membrane constructed of a translucent material, and wherein radiation passes through only the bottom membrane toward the patient.

72. The device of claim 71, wherein the diffuser fluid is positioned between the top membrane and the bottom membrane in a substantially even sheet of fluid.

73. The device of claim 68, wherein the plurality of optoelectronic devices include a plurality of light-emitting diodes.

74. The device of claim 68, wherein the plurality of optoelectronic devices are positioned within the housing in an array, and wherein the array includes optoelectronic devices emitting radiation at a wavelength of at least one of approximately 670 nanometers, 680 nanometers, 730 nanometers, 780 nanometers, 830 nanometers, and 880 nanometers.

75. The device of claim 68, wherein the plurality of optoelectronic devices emit radiation at a wavelength of approximately 688 nanometers.

76. The device of claim 68, wherein the plurality of optoelectronic devices emit radiation having an energy density of approximately 4 Joules per centimeter.

77. The device of claim 76, wherein the plurality of optoelectronic devices emit radiation having a light intensity of approximately 60 milli-Watts per centimeter.

78. The device of claim 77, wherein the radiation blanket is positioned adjacent to the patient and the optoelectronic devices emit radiation toward the patient for approximately 70 seconds in order to treat mucositis.

79. The device of claim 68, wherein a translucent cover plate is disposed between the housing and the radiation blanket to electrically isolate the patient from the plurality of optoelectronic devices.

80. The device of claim 68, and further comprising a cooling system to cool the optoelectronic devices.

81. The device of claim 80, wherein the cooling system includes a plurality of air vents in the housing and an internal heat sink positioned within the housing.

82. The device of claim 80, wherein the cooling system includes a liquid cooling system.

83. The device of claim 82, wherein the liquid cooling system includes a thermoelectric cooler that provides cooling fluid to the plurality of optoelectronic devices via a plurality of passageways.

84. The device of claim 80, wherein the cooling system includes a temperature sensor positioned adjacent to the plurality of optoelectronic devices and a controller coupled to the temperature sensor and to the plurality of optoelectronic devices, and wherein the controller interrupts power to the plurality of optoelectronic devices if an actual temperature sensed by the temperature sensor exceeds a threshold temperature.

85. The device of claim 84, wherein the threshold temperature is approximately 96 degrees Fahrenheit.